

REMARKS

In the Final Office Action dated October 18, 2007, the Examiner rejected claims 1-40. Claims 1-40 remain pending in the application. Applicants respectfully request reconsideration and allowance of all pending claims in view of the following remarks.

Rejections Under 35 U.S.C. §102

In the Final Office Action, the Examiner maintained the rejection of claims 1-4, 6 and 15-18 under 35 U.S.C. §102(b) as being anticipated by Pflaum, U.S. Patent No. 6,324,254 (hereinafter “Pflaum”) and maintained the rejection of claims 25, 37, 38, and 40 under 35 U.S.C. §102(b) as being anticipated by Liu, U.S. Patent No. 6,233,478 (hereinafter “Liu”). Applicants respectfully traverse these rejections.

Legal Precedent and Guidelines

A *prima facie* case of anticipation under 35 U.S.C. §102 requires a showing that each limitation of a claim is found in a single reference, practice or device. *In re Donohue*, 226 U.S.P.Q. 619, 621 (Fed. Cir. 1985). Accordingly, the Applicants need only point to a single element not found in the cited reference to demonstrate that the cited reference fails to anticipate the claimed subject matter.

The Pflaum reference is missing features recited by Independent Claims 1 and 15

Applicants respectfully assert that Pflaum does not anticipate independent claims 1 or 15 under 35 U.S.C. §102(b) because not every element of the claimed invention is disclosed. Specifically, claim 1 recites, *inter alia*, a method of “acquiring a set of motion data for *two or more* organs...,” and claim 15 recites, *inter alia*, a computer program comprising “a routine for acquiring motion data for *two or more* organs...” (emphasis added).

After careful review, Applicants believe that Pflaum does not teach, disclose, or suggest a method or a computer program for imaging an organ comprising at least a step or routine of acquiring motion data for *two or more organs*. In contrast, Pflaum appears

to disclose a “motion detection system . . . by means of which the vessel motion or the motion of *an* organ . . . can be acquired.” *See* Pflaum, col. 3, lines 60-63 (emphasis added). Accordingly, Pflaum appears to disclose a method of imaging an organ which is based on acquiring motion data for a *single* organ, rather than “two or more,” as recited in claims 1 and 15. A method directed at acquiring motion data for a *single* organ for imaging purposes is further supported by the claim language of Pflaum:

An X-ray device for picking up X-ray images of a vessel or organ exhibiting substantially rhythmic movement comprising:

...a monitor for identifying said substantially rhythmic motion associated with said vessel or organ and generation a motion-dependent signal corresponding to said motion...

See id. at claim 11 (emphasis added).

Applicants believe that Pflaum is absent of any language teaching or suggesting the acquisition of motion data for a *plurality* of organs.

In response to these previously noted deficiencies of the Pflaum reference, the Examiner stated that “Pflaum does teach a method of acquiring a set of motion data for two or more organs, that is observing a vessel motion while observing organ motion that causes the vessel motion (see abstract).” Final Office Action, p. 2.

In view of the Examiner’s response, the Applicants here provide the entirety of the Abstract from the Pflaum reference:

In a method and X-ray device for the pickup of X-ray images in an examination of a vessel or organ that moves substantially rhythmically, particularly for the determination of deposits in a vessel, such as a coronary vessel, the X-ray pickup system of an X-ray device is slowly moved along a circular orbit at an angular velocity of less than 6° per second, during which a number of digital X-ray images are picked up, with the image pickup being

triggered by the vessel motion or organ motion acquired during the system movement or by an organ motion that causes the vessel motion, and a 3D image is reconstructed on the basis of the individual images, after the image pickup has ensued.

Pflaum, Abstract (emphasis added).

Based on our review, the Abstract of the Pflaum reference does not appear to support the Examiner's position. In particular, the Abstract does not state that organ and vessel motion are both observed, as the Examiner's comments strongly suggest. Instead, what appear to be the only relevant portion of the Abstract of the Pflaum reference states that "image pickup [is] triggered by ...an organ motion that causes the vessel motion." Pflaum, Abstract (emphasis added). This language does not suggest that both vessel and organ motion are being simultaneously measured and instead suggests that organ motion is used as a surrogate for vessel motion in the absence of explicit vessel motion data. Further, this interpretation appears to be explicitly supported by other passages of the Pflaum reference. For example, the Pflaum reference refers to: "a motion detection system for acquiring ... an organ motion that causes a vessel motion, which generates an output of motion-dependent signals" and that "[f]or this purpose, a motion detection system 13 [is] provided by means of which the vessel motion or the motion of an organ, which causes the motion of the vessel to be examined, can be acquired." Pflaum, col. 2, lines 45-48; col. 3, lines 60-63 (emphasis added). Thus, it appears that the Pflaum reference does not contemplate acquisition of both organ and vessel motion data but instead contemplates the use of organ motion data as a surrogate for vessel motion data, which would likely not be necessary if the vessel motion data were acquired.

Further, even if the Examiner's interpretation were correct and organ and vessel motion data were both acquired, the Pflaum reference still does not appear to contemplate "acquiring a set of motion data for two or more organs" as recited in both claims 1 and 15. Instead, as noted above and in the passage referenced by the Examiner, the Pflaum reference discloses, at best acquisition of motion data for an organ and a vessel associated

with the organ. There appears to be no basis with equating the vessel with an organ as Pflaum clearly distinguishes between vessels and organs. Further, we are of the opinion that one of ordinary skill in the art would not read Pflaum and equate the discussed vessels with organs, particularly in view of the Pflaum reference's separate and distinct use of the term "organ." Thus, even if Pflaum discloses acquiring motion data for both an organ and a vessel, this is still not the recited subject matter of "acquiring a set of motion data for two or more organs."

In view of at least this deficiency, the Pflaum reference does not anticipate independent claims 1 or 15. Furthermore, dependent claims 2-4 and 6 are believed patentable over Pflaum by virtue of their dependency from claim 1, and dependent claims 16-18 are believed patentable over Pflaum by virtue of their dependency from claim 15. Applicants respectfully request allowance of independent claims 1 and 15 and their respective depending claims.

The Liu reference is missing features recited by Independent Claims 25 and 37

Applicants further assert that Liu does not anticipate independent claims 25 and 37 under 35 U.S.C. § 102(b) because not every element of the claimed invention is disclosed. In the Final Office Action, the Examiner specifically stated:

Liu '478 teaches an imager configured to generate a plurality of signals representative of a region of interest; data acquisition circuitry configured to acquire the plurality of signals; data processing circuitry configured to receive process the plurality of signals; system control circuitry configured to operate at least one of the imager and the data acquisition circuitry; an operator workstation configured to communicate with the system control circuitry and to receive the processed plurality of signals from the data processing circuitry; and *a sensor-based motion measurement system configured to measure electrical or non-electrical activity indicative of the motion of two or more organs within the region of interest* (col. 2, lines 2-11; col. 7, lines 45-65; col. 11, lines 17-39). Liu further teaches a system control for acquiring a set of image data representative of an organ of interest using the two or more

prospective gating points (col. 4, lines 66-67; col. 5, lines 1-10).

See Final Office Action, pp. 5-6 (emphasis added).

With regard to claims 25 and 37, the Examiner incorrectly alleges that Liu teaches a system for measuring the motion of *two or more* organs. In particular, claims 25 and 37 respectively recite “a sensor-based motion measurement system configured to measure electrical or non-electrical activity indicative of the motion of two or more organs” and “means for acquiring a set of motion data for two or more organs.”

Liu, however, only appears to disclose a sensor based motion measurement system for a *single* “object,” such as, “an electrocardiograph for monitoring a beating heart to produce an electrocardiogram.” *See* Liu, col. 5, lines 24-29. After careful review, Applicants believe that Liu is absent of any language teaching or suggesting the acquisition of both electrical and non-electrical motion data for a *plurality* of organs and processing the multi-input motion data to determine prospective gating points for imaging an organ of interest.

It is not clear that the Examiner responded to these arguments presented previously by the Applicants. However, in one passage of the “Response to Arguments” section of the Final Office Action, the Examiner did state that:

Regarding Applicant's argument that claim language should be interpreted as reading, “means for acquiring a set of motion data of two or more organs from at least one of or more types of electrical sensors or one or more types of non-electrical sensors”, *the examiner will not add these limitations to the broadest reasonable interpretation of the claim*. Therefore, Liu teaches a sensor based motion system to measure electrical activity of the motion of two or more organs within a region of interest using an electrocardiogram (22). An EKG inherently is indicative of the motion of two or more organs because a beating heart inherently causes motion of the vessels. Thus, the probe with an electrocardiogram, generates motion data indicative

of motion of two or more organs within the region of interest.

Final Office Action, pp. 2-3 (emphasis added).

Applicants respectfully note, however, that the claim language the Examiner appears to be referring to is the claim language of claim 37 and also substantially corresponds to the claim language of claim 25. Thus if the Applicants understand the Examiner's position, it is that the Examiner intends to exclude the actual claim language from the "broadest reasonable interpretation" of these claims. Obviously an interpretation that excludes the claim language itself cannot in any be considered reasonable.

Further, as with the Pflaum reference discussed above, the Applicants do not agree that a "vessel" constitutes an "organ" as one skilled in the art would understand it. Indeed, based on the Examiner's own arguments and the discussion in the references, such as those of Pflaum noted above, it appears clear that an organ and a vessel are separate structures and that the Examiner understands this distinction. In addition, the Applicants respectfully disagree that one skilled in the art, when presented with an EKG, would believe that they had an indication of the motion of two organs. Instead, the Applicants believe that such a person who was skilled in the art would understand that they had a surrogate measure of cyclic rhythms undergone by the heart and by the heart alone.

Therefore, absent compelling and objective evidence from the Examiner as to why a "vessel" should be considered an "organ," particularly, when references such as Pflaum clearly don't consider these terms to be interchangeable, Applicants maintain their traversal of the present rejections. Thus, the Applicant's reiterate that the Liu reference does not appear to disclose a "a sensor-based motion measurement system configured to measure electrical or non-electrical activity indicative of the motion of two or more organs" or a "means for acquiring a set of motion data for two or more organs," as plainly recited in claims 25 and 27, respectively. In view of these deficiencies, among others, Liu cannot

anticipate independent claims 25 or 37. Applicants respectfully request allowance of claims 25 and 37.

The Liu reference is missing features recited by Independent Claims 38 and 40

Applicants respectfully assert that Liu does not anticipate independent claims 38 or 40 under 35 U.S.C. § 102(b) because not every element of the claimed invention is disclosed. In rejecting independent claims 38 and 40, the Examiner relied on the passage quoted above with regard to the rejection of claims 25 and 37.

With regard to independent claims 38 and 40, Applicants note that claim 38 recites, *inter alia*, a “means for acquiring a set of motion data for one or more organs from *at least two of one or more types of electrical sensors or one or more types of non-electrical sensors.*” (emphasis added). Claim 40 recites, *inter alia*, “a sensor-based motion measurement system configured to contribute to the set of motion data by measuring electrical or *non-electrical* activity ... within the region of interest *via at least two of one or more types of electrical sensors or one or more types of non-electrical sensors.*” (emphasis added).

After careful review, Applicants believe that Liu does not teach, suggest, or disclose acquiring sets of motion data from *at least two types of* sensors, as recited in claims 38 and 40. Liu appears to disclose the use of only a single *type of* sensor for acquiring motion data for a single object of interest. *See id.* Applicants believe Liu is absent of any language teaching or suggesting the use of more than one sensor type in a sensor based motion measurement system or any other means for measuring multiple sets of motion data for one or more organs.

In responding to these arguments, the Examiner stated:

Regarding Applicant's arguments that Liu does not anticipate a means for acquiring a set of motion data for one or more organs from at least two of one or more types

of electrical sensors or one or more types of non-electrical sensors, the examiner stands that Liu teaches at least two of one or more types of electrical sensors or one or more types of non-electrical sensors. See (ref. 22 w. electrocardiogram, ref. 23, and fig. 2).

Final Office Action, p. 3.

However, Applicants note that the Examiner appears to be misreading the claims as presented. In particular, claim 38 recites “at least two of one or more types of electrical sensors or one or more types of non-electrical sensors.” Thus claim 38 recites that at least two sensors are present. The at least two sensors may include two or more types of electrical sensors, two or more types of non-electrical sensors, or at least one electrical and at least one non-electrical sensor. Independent claim 40 recites similar subject matter.

In attempting to show this subject matter, the Examiner appears to rely on a probe 22, which Liu discloses to be an electrocardiograph transducer, and the controller 23 that is connected to the probe and receives signals from the probe. Final Office Action, p. 3; Liu, col. 5, lines 25-31. However, it appears clear from the discussion in the Liu reference that the controller 23 is not a sensor of any sort, electrical, non-electrical or otherwise, and is instead the interface by which a signal is received from the probe 22 so that the controller can control the operating of a connected scanner 20. Liu, col. 5, lines 30-34. Thus, contrary to the Examiner’s position, the Liu reference does not appear to disclose the recited subject matter of independent claims 38 and 40, as noted above. Therefore, Applicants respectfully request reconsideration and allowance of claims 38 and 40.

Rejections Under 35 U.S.C. §103

In the office action, the Examiner rejected claims 5, 8-14, and 20-23 under 35 U.S.C. §103(a) as obvious over Pflaum in view of Li et al., U.S. Patent No. 6,836,529 (hereinafter “Li”); claims 7 and 19 under 35 U.S.C. §103(a) as obvious over Pflaum in view of Schweikard et al., U.S. Patent No. 6,144,875 (hereinafter “Schweikard”); claim 24 under 35 U.S.C. §103(a) as obvious over Pflaum in view of Li as applied to claim 20, and further in view of Schweikard; claims 26-28 and 39 under 35 U.S.C. §103(a) as

obvious over Liu in view of Ustuner et al., U.S. Patent Publication 2004/0006266 A1 (hereinafter “Ustuner”); claims 29-31 and 34-36 under 35 U.S.C. §103(a) as obvious over Liu in view of Schlossbauer et al., U.S. Patent Publication 2002/0091314 A1 (hereinafter “Schlossbauer”); and claims 32 and 33 under 35 U.S.C. §103(a) as obvious over Liu in view of Schlossbauer, and further in view of Ustuner. Applicants respectfully traverse these rejections.

Legal Precedent and Guidelines

The pending claims must be given an interpretation that is reasonable and consistent with the *specification*. See *In re Prater*, 415 F.2d 1393, 1404-05, 162 U.S.P.Q. 541, 550-51 (C.C.P.A. 1969) (emphasis added); see also *In re Morris*, 127 F.3d 1048, 1054-55, 44 U.S.P.Q.2d 1023, 1027-28 (Fed. Cir. 1997); see also M.P.E.P. §§608.01(o) and 2111. Indeed, the specification is “the primary basis for construing the claims.” See *Phillips v. AWH Corp.*, No. 03-1269, -1286, at 13-16 (Fed. Cir. July 12, 2005) (*en banc*). One should rely *heavily* on the written description for guidance as to the meaning of the claims. See *id.*

Interpretation of the claims must also be consistent with the interpretation that *one of ordinary skill in the art* would reach. See *In re Cortright*, 165 F.3d 1353, 1359, 49 U.S.P.Q.2d 1464, 1468 (Fed. Cir. 1999); M.P.E.P. §2111. “The inquiry into how a person of ordinary skill in the art understands a claim term provides an objective baseline from which to begin claim interpretation.” See *Collegenet, Inc. v. ApplyYourself, Inc.*, 418 F.3d 1225, 75 U.S.P.Q.2d 1733, 1738 (Fed. Cir. 2005) (quoting *Phillips v. AWH Corp.*, 75 U.S.P.Q.2d 1321, 1326). The Federal Circuit has made clear that derivation of a claim term must be based on “usage in the ordinary and accustomed meaning of the words amongst artisans of ordinary skill in the relevant art.” See *id.*

The burden of establishing a *prima facie* case of obviousness falls on the Examiner. *Ex parte Wolters and Kuypers*, 214 U.S.P.Q. 735 (PTO Bd. App. 1979). In addressing obviousness determinations under 35 U.S.C. §103, the Supreme Court in *KSR*

International Co. v. Teleflex Inc., No. 04-1350 (April 30, 2007), reaffirmed many of its precedents relating to obviousness including its holding in *Graham v. John Deere Co.*, 383 U.S. 1 (1966). In *Graham*, the Court set out an objective analysis for applying the statutory language of §103. *KSR*, *slip op.* at 2. The *KSR* court did not diminish the requirement for objective evidence of obviousness. *Id.* at 14 (“To facilitate review, this analysis should be made explicit. See *In re Kahn*, 441 F.3d 977, 988 (CA Fed. 2006) (“[R]ejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness”). As our precedents make clear, however, the analysis need not seek out precise teachings directed to the specific subject matter of the challenged claim, for a court can take account of the inferences and creative steps that a person of ordinary skill in the art would employ.”); see also, *In re Lee*, 61 U.S.P.Q.2d 1430, 1436 (Fed. Cir. 2002) (holding that the factual inquiry whether to combine references must be thorough and searching, and that it must be based on *objective evidence of record*).

In *KSR*, the Court also reaffirmed that “a patent composed of several elements is not proved obvious merely by demonstrating that each of its elements was, independently, known in the prior art.” *Id.* at 14. Further, when prior art references require a selected combination to render obvious a subsequent invention, there must be some reason for the combination other than the hindsight gained from the invention itself, i.e., something in the prior art as a whole must suggest the desirability, and thus the obviousness, of making the combination. *Uniroyal Inc. v. Rudkin-Wiley Corp.*, 837 F.2d 1044, 5 U.S.P.Q.2d 1434 (Fed. Cir. 1988). One cannot use hindsight reconstruction to pick and choose among isolated disclosures in the prior art to deprecate the claimed invention. *In re Fine*, 837 F.2d 1071, 5 U.S.P.Q.2d 1596 (Fed. Cir. 1988). The Federal Circuit has warned that the Examiner must not, “fall victim to the insidious effect of a hindsight syndrome wherein that which only the inventor taught is used against its teacher.” *In re Dembiczak*, F.3d 994, 999, 50 U.S.P.Q.2d 52 (Fed. Cir. 1999) (quoting *W.L. Gore & Assoc., Inc. v. Garlock, Inc.*, 721 F.2d 1540, 1553, 220 U.S.P.Q. 303, 313 (Fed. Cir. 1983)).

The Pflaum and Li references, taken alone or in hypothetical combination, fail to teach or suggest features recited by independent claims 8 and 20

Turning to the claims, the present independent claim 8 recites, *inter alia*, “acquiring a set of motion data for one or more organs from at least two of one or more types of electrical sensors and one or more types of non-electrical sensors,” and claim 20 recites, *inter alia*, “a routine for acquiring a set of motion data for one or more organs from at least two of one or more types of electrical sensors and one or more types of non-electrical sensors.” (emphasis added). As discussed previously, Pflaum appears to disclose the use of only a single sensor type for acquiring motion data from a single organ. The Examiner stated that Li teaches “acquiring data indicative of motion from two or more organs from two of one or more types of electrical sensors.” *See* Final Office Action, p. 8.

After careful review, Applicants believe that the Pflaum and Li references, taken alone or in hypothetical combination, fail to teach the use of *both* electrical *and* non-electrical sensors, as recited in claims 8 and 20. Although Li discloses the possibility of using different types of sensors to acquire respiratory data signals as an *alternative* to using an EKG sensor, it appears that Li fails to obviate the deficiencies of Pflaum because it does not suggest or teach the use of two or more sensor types in order to determine prospective gating points for imaging an organ of interest.

In response to Applicants previously presented arguments, the Examiner merely “instructs Applicant to review Li specifically where Li teaches at least two of one type of electrical signals.” Final Office Action, pp. 3-4. The Examiner, however, fails to provide any citation or indication where Li supposedly discloses such subject matter. Further, as noted above, Applicants have reviewed the Li reference and can find no indication where the disclosure alleged by the Examiner may be found. Instead, as noted above, the Li reference appears to merely disclose the possibility of using different types of sensors to acquire respiratory data signals as an *alternative* to using an EKG sensor, however the Li reference does not appear to disclose the use of two or more sensor types. Thus, Applicants believe that the Li reference does not appear to disclose the recited subject

matter. Further, the Applicants respectfully request that, per 37 C.F.R. §1.104(c)(2), if the Examiner intends to maintain the present rejection, the Examiner designate or identify the portion of the Li reference relied upon. In view of these deficiencies of the Li reference, the Applicants respectfully request allowance of independent claims 8 and 20.

The Liu and Schlossbauer references, taken alone or in hypothetical combination, fail to teach or suggest features recited by independent claim 31

Independent claim 31, as amended, recites, *inter alia*, “two or more sensor-based motion measurement systems, wherein each sensor-based motion measurement system is configured to measure electrical or non-electrical activity indicative of the motion of *two or more* organs within the region of interest.” (emphasis added). As discussed previously, Liu appears to disclose acquiring motion data from a *single* organ. Although Schlossbauer seems to suggest the use of multiple types of sensors for measuring electrical or non-electrical motion data, after careful review, Applicants believe the reference does not teach or suggest acquiring data from multiple organs. In view of this deficiency, among others, Liu and Schlossbauer, taken alone or in hypothetical combination, cannot render obvious the current amended independent claim 31 and claims depending therefrom.

The Liu and Ustuner references, taken alone or in hypothetical combination, fail to teach or suggest features recited by independent claim 39

Independent claim 39 recites, *inter alia*:

An imaging system comprising:

...system control circuitry configured to operate at least one of the imager and the data acquisition circuitry based upon two or more prospective gating points derived from a set of motion data describing the motion of *two or more organs* within the region of interest...

...a sensor-based motion measurement system configured to measure electrical or non-electrical activity indicative of the motion of at least one of the *two or more organs* within the region of interest to contribute to the set of motion data.

(emphasis added).

As discussed previously, Liu appears to disclose acquiring motion data from a *single* organ. In the office action, the Examiner stated that Ustuner “teaches activating one or two or more electrical sensors to measure more than one physiological parameter indicative of motion in *more than one organ*.” See Final Office Action, p. 10 (emphasis added).

After careful review, Applicants believe that Ustuner fails to teach or suggest the use of multiple sensors to measure electrical or non-electrical activity indicative of the motion of at least one of the *two or more organs*, as recited in claim 39. Rather, it appears that Ustuner only suggests alternatives to using an ECG. This notion is further supported by Fig. 1 of Ustuner. See *id.* at Fig. 1. The ECG input (24) appears to be a single input communicating with a processor (18). When interpreting the figure with the above cited passage, it appears that Ustuner is only suggesting that the single input, though denoted as an ECG input, may instead be an input for other types of sensor devices (such as one for respiratory measurements). Accordingly, Applicants believe that Ustuner does not suggest using multiple sensor devices used to acquire motion data for multiple organs.

In responding to the arguments previously made by the Applicant, the Examiner stated that “the Examiner stands that an EKG inherently is indicative of the motion of two or more organs because a beating heart inherently causes motion of the vessels.” Final Office Action p. 4. However, as noted previously, the Applicants respectfully disagree that one of ordinary skill in the art would consider the blood vessels attached to an organ

to be a separate organ. In view of this deficiency, among others, Liu and Ustuner, taken alone or in hypothetical combination, cannot render obvious independent claim 39.

Dependent Claims

In the office action, the Examiner rejected the remaining dependent claims under 35 U.S.C. § 103(a) based upon the Pflaum and Liu references discussed above in view of additional, secondary references. However, these secondary references do not obviate the deficiencies of the Pflaum and Li references, as discussed above. Accordingly, all dependent claims are believed to be allowable at least by virtue of their dependency from an allowable base claim.

Conclusion

In view of the remarks set forth above, Applicants respectfully request allowance of the pending claims. If the Examiner believes that a telephonic interview will help speed this application toward issuance, the Examiner is invited to contact the undersigned at the telephone number listed below.

Respectfully submitted,

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